SOIL SURVEY OF WORCESTER COUNTY, MARYLAND.

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LOCATION AND BOUNDARIES OF THE AREA.

Worcester County is situated on the lower eastern peninsula of Maryland. It is included between the parallels of 38° and 38° 27′ north latitude and the meridians 75° 3′ and 75° 40′ west longitude. It is bounded by Wicomico County, Md., and Sussex County, Del., on the north; on the east by the Atlantic Ocean; on the south by Accomac County, Va., and on the west by Somerset and Wicomico

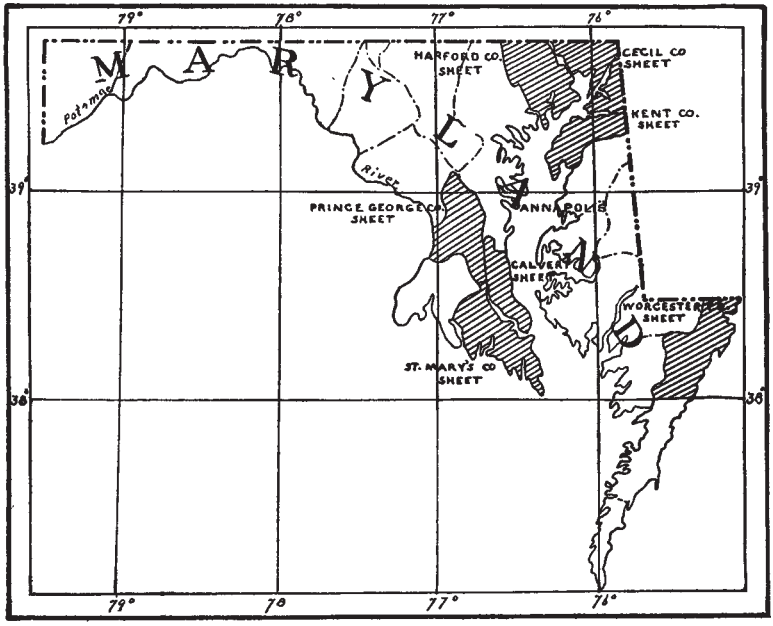

FIG. 6.—Sketch map showing location of the Worcester County area, Maryland.

counties, Md. It is the only county of the State bordering on the Atlantic seaboard and lies wholly within the Coastal Plain.

Its extent from east to west in the widest place is about 25 miles and from north to south about 28 miles, but the outline is irregular and the area of the land surface is only 463 square miles. It is cut by frequent tide-water embayments and estuaries, many of which are navigable.

The county is divided into nine districts and has a population of about 21,000. Snowhill is the county seat, and Berlin and Pocomoke City are the other principal towns.

HISTORY OF SETTLEMENT AND AGRICULTURAL DEVELOPMENT.

The first recorded visit of a white man to the lower Eastern Shore was the voyage of Capt. John Smith up the Pocomoke River in search of fresh water in the year 1608. Several patents for land in this vicinity were granted by the Proprietary as early as 1657, but prior to 1660 settlers were few and widely scattered.

The early white settlers were nearly all English. They brought with them bond and indentured servants. African and Indian slaves were early employed with profit in growing tobacco and flax, the staple crops. Money was scarce and tobacco was the medium of exchange for over a hundred years.

Until 1742 the area under consideration was a part of Somerset County, but in that year it was made a separate county, with the seat of government at Snowhill, its present location. Attracted by the religious freedom enjoyed under the celebrated "toleration act" of 1649, quite a number of Presbyterians and Quakers settled within the present confines of the county.

The cultivation and use of corn and sweet potatoes was adopted from the Indians. Direct communication with the mother country was for a long time kept up by the large landholders, who, in addition to their agricultural pursuits, manufactured many of the articles consumed on the plantation and maintained a line of boats by which they shipped their tobacco, flax, and other agricultural products to England in exchange for such commodities as they were unable to produce.

The cultivation of tobacco was abandoned just before the civil war, and was superseded by the cultivation of wheat and corn, which have remained the staple crops of the area to the present day. Large numbers of slaves were employed in the production of these crops, and as a result of their emancipation large tracts were thrown out of cultivation from lack of labor. The large area of Elkton clay around Libertytown was a rich wheat-producing section when labor was plentiful and slaves could be employed in cutting new drainage ditches and keeping the existing ones open. Since the civil war the ditches and canals have filled up, drainage has become obstructed, and this once rich section is now largely abandoned.

The sharp competition of the Western States in the production of grain still further reduced the profits of agriculture, and as it offered small inducement to the ambitious and energetic, most of the young men abandoned agriculture for mercantile and business pursuits. However, with a better realization of the especial adaptation of soils to crops and with more intensive methods of farming,

agriculture now offers more inducement to the young man, and it is hoped that the tide is now turning from the crowded professions of the city. Certainly no greater opportunity for success in agriculture offers anywhere than in Worcester County, where the possibilities of the soil have only begun to be recognized.

CLIMATE.

The following table shows the normal monthly and annual temperature and precipitation, compiled from the records of the Weather Bureau. The records at Pocomoke City are a fair representation of climatic conditions for those portions of the county near tide level, while the records of Princess Anne, the county seat of Somerset County, a few miles from the limits of this area, show the conditions obtaining throughout the upland portions of the county. It will be noticed that the rainfall on the upland is slightly greater during the summer months and somewhat less in the spring and fall than in the tide-water section. The annual precipitation varies but little.

Normal monthly and annual temperature and precipitation.

Month.	Pocomoke City.		Princess Anne.		Month.	Pocomoke City.		Princess Anne.	
	Temperature.	Precipitation.	Temperature.	Precipitation.		Temperature.	Precipitation.	Temperature.	Precipitation.
	°F.	*Inches.*	°F.	*Inches.*		°F.	*Inches.*	°F.	*Inches.*
January	38.9	2.38	37.5	2.30	August	77.2	3.60	75.8	3.72
February	36.7	4.14	38.3	4.10	September	71.9	2.69	69.6	2.45
March	47.3	3.53	46.7	3.64	October	60.9	3.39	57.1	3.75
April	55.6	3.52	55.4	2.85	November	52.0	2.90	48.7	2.59
May	65.8	3.45	64.1	2.82	December	42.6	2.41	40.4	2.05
June	74.0	2.27	72.3	2.91	Year	58.4	38.82	56.9	38.24
July	78.4	4.54	77.2	5.06					

Dates of the earliest and latest killing frosts reported at the same stations, covering a period of eight years, are shown in the table below. From this will be noted the greater freedom of the tidewater portions from severe frosts and longer growing season caused by the modifying influence on the climate of proximity to large bodies of water. It is likely that this is even more marked on the forelands of the coast, but no reliable data are available.

Dates of earliest and latest killing frosts.

Year.	Pocomoke City.		Princess Anne.	
	Last in spring.	First in fall.	Last in spring.	First in fall.
1894	April 9	October 17		September 19.
1895	April 19		April 12	
1896	April 9	October 22	April 11	September 24.
1897	April 21	November 14	May 9	October 18.
1898	April 4	November 12	April 12	October 17.
1899	May 25	October 1	May 26	September 28.
1900	April 10	November 13	April 15	October 18.
1901		October 5	April 29	October 4.

Owing to the slight range in elevation of Worcester County there are no other marked climatic differences. The prevailing wind is westerly, but because of the generally level topography of the area its influence is uniform.

PHYSIOGRAPHY AND GEOLOGY.

Worcester County lies wholly within the physiographic division known as the Atlantic Coastal Plain, and consists of unconsolidated sands, loams, and clays, representing the latest Pleistocene deposition, with some later modifications, such as swamps and drifting sand hills.

This horizon in Maryland has been described as the Talbot formation. It was primarily laid down as a marine sediment, and owes its present condition to the sorting power of running water, which has made possible the occurrence of sand, loam, and clay indiscriminately at equal elevations above tide level. The texture of this formation in Worcester County is somewhat finer than elsewhere in Maryland, due to the low elevations and proximity to tide, as the sediment-laden currents naturally deposited the coarser particles first, and only the finer material reached the calmer waters farther out.

This mode of deposition has given this low-lying and comparatively level area a wider range of soils and more diversified agricultural interests than might naturally have been expected. The gravels so noticeable over a part of the Maryland coastal plain are lacking here, and the recurrence of certain soil types between definite elevations does not hold true to such a degree in this area as in some other parts of the State.

The land surface of Worcester County consists of a gently rolling table-land having a maximum elevation above tide of 64 feet, with a very gradual descent toward the west, while the eastern slope is more abrupt. The upland has an average elevation of about 35 feet above tide. The Atlantic drainage is by many short streams flowing in a general southeasterly direction into tide-water embayments. By far the greater portion of the county is drained in a southerly and southwesterly direction into Chesapeake Bay by the Pocomoke River and its tributaries. The fall of the Pocomoke River is slight, being less than 35 feet throughout the length of the county, and considerable areas of marshy land occur adjacent to this drainage system. Much of the forelands lying between the embayments and the slight escarpment along the eastern shore are low lying and marshy, and are unsuited to cultivation in their present condition.

The northern and northwestern parts of the county consist of a level, plateaulike area varying but slightly in elevation, except for the narrow ridges of drifting sand which occur throughout this area. They rise but a few feet higher than the general level and are much used as a location for the roads, a matter of importance in this part of

the area, where, from the general level character of the country and consequent lack of drainage, water stands on the surface a greater part of the year and any slight depressions are apt to be quite swampy.

The descent from the plateau to the bay on the east is marked by much less uniform conditions, as is also, though in a less degree, the slope toward Pocomoke River on each side. On the slopes and near tide level the action of waves, shore-line deposits, and the erosion and degradation going on through the agency of streams ever since the elevation of the land above the sea have contributed to the mingling of the soil-forming materials, and sands, loams, and clays occur with little uniformity at the same elevation.

A long, low bar of beach sand, giving rise to the type of soil known as Galveston sand, protects the entire shore line from the full force of the Atlantic and forms three shallow salt-water bays. The salt marshes and islands in the bays inclosed by this beach are of recent origin, some having been formed, others removed, and the configuration of many changed by a recent severe storm which completely filled an inlet in the beach. The finest sands from the dunes on the beach are continually being blown into the bay, which is only from 3 to 6 feet deep, and during high storms more or less of this material is being deposited above the reach of ordinary tides, while other areas are washed away by storms coming from a different direction from the ones which caused their formation.

Wherever the topography is at all broken or rough the soil consists of a loose sand to great depths, giving rise to the Norfolk sand type. Along the margins of the larger streams, where backwater rises from 2 to 6 feet with every tide, there are quite extensive areas of fresh-water swamp unsuited to cultivation. Near the Delaware boundary line and in smaller areas throughout the county upland swamps exist. These should be drained, both to reclaim the land and for hygienic reasons.

SOILS.

Considering the fact that the area lies entirely within one geological province, a relatively large variety of soil types is found. Excluding swamp, which is not a cultivated type, there are nine distinct soils shown on the soil map. The areal extent of each of these is given in the following table:

Areas of different soils.

Soil.	Acres.	Per cent.	Soil.	Acres.	Per cent.
Sassafras sandy loam	54,848	18.5	Norfolk fine sand	22,400	7.6
Elkton clay	50,432	17.0	Sassafras loam	14,400	4.9
Norfolk sand	45,312	15.3	Portsmouth sandy loam	9,856	3.3
Portsmouth sand	41,024	13.8	Galveston sand	8,064	2.7
Swamp	26,048	8.8	Total	296,320	
Galveston clay	23,936	8.1			

SASSAFRAS LOAM.

The surface soil of Sassafras loam consists of a mellow brown loam with an average depth of 8 inches. It is silty in character and does not contain any appreciable amount of sand. Small areas occurring in the Elkton clay are yellow in color and heavier in texture than the typical soil. The subsoil, from 8 to 36 inches, is a uniform heavy yellow loam or clay loam containing considerable silt, massive but friable, underlain at from 3 to 10 feet by a layer of fine yellow sand similar to that underlying the Sassafras sandy loam at slightly less depth, outcrops of which along the Atlantic slope contribute largely to the formation of the Norfolk fine sand. In texture the Sassafras loam does not differ widely from the Elkton clay, but the structural differences are very marked. The loam does not puddle and bake like the clay, but retains its mellow and friable character.

The principal occurrences of Sassafras loam in Worcester County are on the west bank of Pocomoke River near Cottingham Ferry, opposite Snowhill, between Snowhill and Girdletree, and in an irregular, broken belt extending along the crest of the divide between the principal drainage systems, from a little below Newark northeasterly to Campbell and Showell. Other small areas occur in or adjacent to the Elkton clay.

This type is found at varying elevations from tide level to the higher portions of the Coastal Plain, but in this area it is most typically developed on the gently rolling upland of the ridge which divides the Atlantic drainage from that toward Chesapeake Bay, and as inclined terraces along Pocomoke River at an average elevation of 30 feet, having a range in both phases of its occurrence of from 6 to 40 feet above tide. It is never so steep as to interfere with tillage.

To its position, topographic features, and consequent better natural drainage it probably owes its present texture and wide physical difference from the Elkton clay type which it usually adjoins.

In this county the natural drainage is augmented by the stratum of fine sand which underlies this type, usually at a depth slightly greater than 3 feet. Artificial drainage is rarely necessary, but in some more level areas tiling would be of benefit by putting the ground in condition for planting earlier in the season.

The Sassafras loam is here derived from a residual weathering, since their elevation above tide, of the finer sediments of the late Pleistocene deposition. Weathering has progressed to a much greater extent in this type than in those beds of finer sediments giving rise to the Elkton clay, as is evidenced by the color of the subsoil and the more mellow and porous texture of the loam.

The subsoil of this type, being capable of maintaining a good supply of moisture during a long season and at the same time allowing a good

circulation by reason of its structure, makes the soil admirably adapted to those crops which require a long period of growth to bring them to maturity. It is well suited to wheat, of which it produces a fine quality and good yield, and it is to this soil that eastern Maryland owes her record for a continued, steady production of this staple over so long a period of years. Under favorable climatic conditions and intelligent cultivation it is capable of producing from 35 to 45 bushels of wheat per acre, but the general average falls much short of that figure, and perhaps 20 to 25 bushels would represent the average crop from one season to another. Corn does well, particularly in dry seasons, and will average from 40 to 50 bushels per acre, depending largely on the preparation of the ground and the subsequent care it receives.

The Sassafras loam is well suited to grass, and especially clover, which grows luxuriantly and averages about 2 tons of hay per acre, while some areas of the soil will produce even more. Fruit trees make a good growth and are long lived. Several extensive nurseries are successfully established on the Sassafras loam.

The adaptation to small grains and grass has long been recognized, and the type has been well developed in this area, reaching a value of $100 per acre for the best improved land. More attention might well be given to stock raising and dairying, not alone as a means of profit, but also to maintain the fertility of the soil.

The following table gives mechanical analyses of the soil and subsoil of this type:

Mechanical analyses of Sassafras loam.

No.	Locality.	Description.	Organic matter.	Gravel, 2 to 1 mm.	Coarse sand, 1 to 0.5 mm.	Medium sand, 0.5 to 0.25 mm.	Fine sand, 0.25 to 0.1 mm.	Very fine sand, 0.1 to 0.05 mm.	Silt, 0.05 to 0.005 mm.	Clay, 0.005 to 0.0001 mm.
			P. ct.	*P. ct.*	*P. ct.*	*P. ct.*	*P. ct.*	*P. ct.*	*P. ct.*	*P. ct.*
8542	1¼ miles W. of Showell.	Brown silty loam, 0 to 9 inches.	2.42	0.80	5.74	9.28	21.14	11.96	38.90	12.42
8540	2 miles NW. of Cottingham Ferry.	Brown silty loam, 0 to 8 inches.	1.20	.80	5.00	7.20	14.20	5.74	51.80	14.98
8544	1½ miles S. of Berlin.	Brown silty loam, 0 to 8 inches.	1.62	.60	3.90	5.80	17.70	12.20	44.62	15.42
8543	Subsoil of 8542.....	Heavy yellow loam, 9 to 36 inches.	.44	.40	3.82	6.08	13.68	11.82	45.02	19.42
8545	Subsoil of 8544.....	Heavy yellow loam, 8 to 36 inches.	.14	.60	3.58	5.18	17.58	12.08	40.66	19.64
8541	Subsoil of 8540.....	Heavy yellow loam, 8 to 36 inches.	.43	.80	4.70	6.04	11.24	4.50	52.44	19.94

SASSAFRAS SANDY LOAM.

The soil of the Sassafras sandy loam to an average depth of 9 inches consists of a mellow brown sandy loam. It is uniform over large areas, varying but slightly in depth and texture. The subsoil from 9 to 36 inches is a medium to heavy yellow loam containing some sand and is often underlain at from 30 to 40 inches by a stratum of fine yellow sand. The subsoil is similar to, but lighter than, the subsoil of the Sassafras loam.

This type is of wide and irregular distribution throughout the area. It is most persistent on the forelands of the Atlantic drainage and the slope toward Pocomoke River on both sides. It is lacking in the northwestern part of the county west of Pocomoke River, but extends east across the ridge from that stream to the coast in a narrow belt. A considerable area is found near the confluence of Dividing Creek and Pocomoke River, and also around Pocomoke City.

The Sassafras sandy loam ranges in elevation from tide level to 40 feet above, but the greater portion lies at a comparatively slight elevation and occupies gently inclined slopes and level terraces. It is never so steep as to render tillage difficult. The changes in elevation are never abrupt and are characterized by broad, smooth contours.

The Sassafras sandy loam, on account of its position, sandy, mellow surface soil, and moisture-retaining capacity of the subsoil, is adapted to a wide range of crops under varying conditions and is much esteemed as a general-purpose soil. It is locally termed "red clay bottom" in distinction to the Sassafras loam, which is called "red clay," although the color of the subsoil of both types is a distinct yellow.

The principal crop grown is wheat, which yields 20 to 30 bushels per acre on the heaviest phase of the type in fair seasons and from 15 to 20 bushels on the lighter areas, these yields depending largely on the amount of fertilizer used. It is a strong corn and Irish potato soil, the former yielding from 40 to 60 bushels per acre, the latter from 100 to 400 bushels. It is also a natural clover soil, and from 1 to 3 tons per acre of mixed clover and timothy hay are grown, with an average of 1½ tons. Fruits and heavy truck do well, and stock raising is profitable on this type.

Much sought after as a general-purpose soil, the Sassafras sandy loam is perhaps the most easily managed and best understood soil of the area. It responds readily to applications of fertilizer and lime. The use of the latter is not as liberal nor as general as the results warrant. The production of Irish potatoes is a growing industry on this type, to which it should prove well suited, and the heavy truck and canning crop interests should be extended when market and transportation facilities permit.

The texture of the soil and subsoil is such that natural drainage is usually good. The moisture-holding capacity of the subsoil is much greater than in the heaviest phases of the other sandy types in the area, and consequently a much greater variety of crops can be profitably grown. It is more nearly allied to the sandy types than to the other sandy loams in natural drainage features, as the underlying sand stratum assists in no small degree in removing surplus moisture. Some small, poorly drained areas are ditched. Much of this type is under cultivation.

Consisting of sediments of marine deposition, this type is generally a terrace formation and seems to have resulted from a mingling of sand with the finer particles giving rise to the Sassafras loam, to which this type is closely related. The grade and the quantity of the sand contained varies perceptibly in different areas, as the character of the materials brought down by the different streams constantly varied at the time of its final deposition. Since its elevation above sea level the soil has undergone considerable weathering and modification, as is evidenced by the depth and mellow character of the soil, the bright color of the subsoil, and its relation to the Sassafras loam.

The following table gives mechanical analyses of the soil and subsoil of this type:

Mechanical analyses of Sassafras sandy loam.

No.	Locality.	Description.	Organic matter.	Gravel, 2 to 1 mm.	Coarse sand, 1 to 0.5 mm.	Medium sand, 0.5 to 0.25 mm.	Fine sand, 0.25 to 0.1 mm.	Very fine sand, 0.1 to 0.05 mm.	Silt, 0.05 to 0.005 mm.	Clay, 0.005 to 0.0001 mm.
			P. ct.	*P. ct.*	*P. ct.*	*P. ct.*	*P. ct.*	*P. ct.*	*P. ct.*	*P. ct.*
8548	1 mile SE. of Jones.	Brown sandy loam, 0 to 9 inches.	1.32	1.70	11.56	14.60	29.90	9.20	24.10	9.00
8546	1 mile NW. of Boxiron.	Brown sandy loam, 0 to 8 inches.	.99	.90	5.98	10.18	35.06	10.98	27.50	9.32
8550	1¼ miles NW. of Snowhill.	Brown sandy loam, 0 to 10 inches.	1.67	1.50	8.58	12.94	30.84	7.72	27.74	9.90
8549	Subsoil of 8548....	Loam to sandy loam, 9 to 36 inches.	.22	1.10	12.50	17.18	31.04	7.38	17.38	13.22
8547	Subsoil of 8546....	Yellow sandy loam, 8 to 36 inches.	.24	.50	4.10	10.00	35.80	9.98	25.14	13.94
8551	Subsoil of 8550....	Yellow loam, 10 to 36 inches.	.26	.98	6.80	9.80	27.10	7.80	28.06	19.12

NORFOLK SAND.

The soil of the Norfolk sand varies from 6 to 12 inches in depth, with an average depth of 9 inches. It is a medium brown sand, usually loose and incoherent, but sometimes slightly loamy from accumulation of organic matter, especially in small depressions. The color is vari-

able and may be gray or yellowish, when it differs but little from the subsoil, and no abrupt line of demarcation can be seen. The subsoil to a depth of 36 inches or more, often to great depths, consists of a coarse to medium loose yellow sand, rarely a deep orange in color and sometimes slightly sticky.

This soil type occurs in an almost unbroken belt along the east bank of Pocomoke River, varying in width from a few rods to more than a mile. It borders most of the other large streams throughout the greater part of their length, occurs in irregular patches and narrow ridges throughout the county, and is found in the other soil types, with the single exception of the Elkton clay.

The Norfolk sand occupies all elevations from near tide level to the highest parts of the county and is developed wherever wind, wave-action, or stream transportation has succeeded in piling up to a depth of 3 feet or more the loose materials which constitute the type.

The wind-formed areas usually present a narrow ridge or hillock topography a few feet higher in elevation than the surrounding soil; the stream-deposited areas display the most rolling and broken features, while that deposited by quiet waters and wave action is nearly level or gently undulating. Owing to its loose texture the surface is continually changing in dry seasons where subjected to clean cultivation.

From its porous texture and generally inclined or gently rolling position it is naturally a well-drained, warm, early soil. It is unable to maintain a large moisture supply, and crops requiring a long growing season are liable to suffer from drought, except in those favorable positions near tide level, where the permanent water table rises sufficiently high to maintain the moisture supply. In those locations the soil is better suited to the production of the small grains and grasses than are the higher lying areas.

The materials constituting this type were originally laid down as a marine sediment, but a large part of the Norfolk sand in this area owes its occurrence and surface features to more recent alluvial deposition, and to wave and wind action—forces which are still at work.

The material composing the soil is principally quartz sand, which has undergone little change, and no sharp distinction can be drawn between the soil and subsoil, except the usually darker color of the soil due to the accumulation of decaying vegetation, particularly in small depressions where the accumulation has been greatest.

Corn is the chief crop, and in fair seasons will produce from 15 to 25 bushels per acre, but the average yield is less. The yield varies greatly in a single field, the growth being stunted on the ridges from lack of moisture, while the intervening depressions and level portions which receive the drainage from the ridges produce a larger growth. Irish potatoes do fairly well under favorable moisture conditions and yield from 75 to 100 bushels per acre on the average. Sweet potatoes are

extensively grown, and produce about 150 bushels per acre. Berries and tomatoes are also grown, and are early and of fine quality. On the low-lying areas fair crops of grass, wheat, and oats are grown. Cowpeas are quite generally used to maintain the fertility and improve the texture of the soil.

The Norfolk sand is preeminently an early truck soil, which has reached a much higher state of development in the adjoining Atlantic States and elsewhere in Maryland under the influences of more intensive cultivation and proximity to markets. This natural adaptation has been but slightly recognized, or rather utilized, in this section, and corn continues to be the chief crop. With the gradual introduction of canneries and improvement of transportation facilities this type should assume its proper place as an early truck soil.

The drifting of the dunelike ridges should be prevented by growing crops less cleanly cultivated than corn. The addition of humus, plowing under of green crops, and the use of lime on this type should receive more attention.

The following table gives mechanical analyses of the soil and subsoil of this type:

Mechanical analyses of Norfolk sand.

No.	Locality.	Description.	Organic matter.	Gravel, 2 to 1 mm.	Coarse sand, 1 to 0.5 mm.	Medium sand, 0.5 to 0.25 mm.	Fine sand, 0.25 to 0.1 mm.	Very fine sand, 0.1 to 0.05 mm.	Silt, 0.05 to 0.005 mm.	Clay, 0.005 to 0.0001 mm.
			P. ct.	*P. ct.*	*P. ct.*	*P. ct.*	*P. ct.*	*P. ct.*	*P. ct.*	*P. ct.*
8524	3 miles NE. of Snowhill.	Coarse sand, 0 to 10 inches.	0.42	1.60	17.32	36.12	41.38	0.90	0.94	1.70
8522	1 mile N. of Welbourne.	Medium to fine sand, 0 to 7 inches.	1.01	2.00	8.46	19.06	52.66	7.10	5.78	4.68
8525	Subsoil of 8524....	Yellow sand, 10 to 36 inches.	.15	.60	10.10	32.40	50.60	3.20	1.36	1.58
8523	Subsoil of 8522....	Yellow medium sand, 7 to 36 inches.	.48	1.70	9.70	21.60	58.96	5.60	3.86	3.18

NORFOLK FINE SAND.

The Norfolk fine sand consists of a brown loamy sand of fine texture to a depth of from 8 to 12 inches, with an average of 10 inches. It is underlain to a depth of more than 36 inches by a subsoil of fine yellow sand, ranging from loamy or slightly sticky to occasionally loose and incoherent sand in the lower depths. The surface soil is usually mellow and friable, but compacts slightly when wet, and sometimes forms a thin crust on drying. The color of both soil and subsoil is very uniform. In texture it is intermediate between the Norfolk sand and the Sassafras sandy loam, being finer, loamier, and more

compact than the former and lacking the heavier subsoil of the latter. It often merges into these types with no sharply defined boundaries. In surface appearance it is very much like Sassafras sandy loam.

This type is confined to the low necks and lower slopes of the Atlantic drainage section of the county, and occurs in considerable areas around Georges Island Landing, east of Newark, and near Sinepuxent Neck and Shingle Landing, as well as in numerous small areas and on islands in the bays. Beds of oyster shells a few inches in thickness are found at various depths on most of the islands.

In this area the Norfolk fine sand ranges in elevation from sea level to 25 feet above, most of the type occurring at low elevation near salt marshes and on low necks between small stream courses. It is marked by a gently inclined or undulating topography, the latter configuration being best developed near tide water—probably as the result of wave action. The knolls do not rise over 10 feet above the more level portion of the type and are smooth and rounded.

While the texture is such as to permit free moisture circulation, it is sufficiently fine and loamy to maintain a fair supply of water for the need of most crops in an ordinary season and is not so droughty as the looser Norfolk sand. It is an early, warm soil and seldom requires artificial drainage. On account of its low elevation the permanent water table is never far below the surface.

Consisting of sediments originally deposited under water, this type owes its present texture to various more recent agencies, such as wind and wave transportation, erosion, and creeping from the fine sand stratum which underlies several upland types, and washing down and intimate mingling of the materials constituting the slight escarpment to the west. The small islands and areas along Sinepuxent Beach were formed from the fine sands blown from the beach in time of severe storms.

Corn is the staple crop grown on this soil and yields from 25 to 40 bushels or more per acre, depending on the elevation. More recently Irish potatoes, to which it is well suited, have come to be an important crop on this type. Yields vary from 100 to 400 bushels per acre. The tubers are smooth, round, and uniform, with few of unmarketable size. Sweet potatoes do well and give good yields. Some tomatoes are grown for market with profit. Wheat and grass are but little grown, except for rotation, and with little expectation of a profitable crop. The islands are chiefly used for grazing.

The Norfolk fine sand is admirably adapted to late trucking crops and market gardening. Although not as early as the Norfolk sand, it maintains a much better moisture supply, and crops are not so readily affected by slight drought. Those portions lying near tide level are capable of producing good crops of corn and fair crops of grass. This type affords excellent opportunities for general trucking and the pro-

duction of canning crops. It is easily worked and responds readily to fertilizers. The general value of improved farms on this type is from $15 to $25 per acre. The use of lime, plowing under of green crops, and growing of leguminous crops would all be beneficial.

The following table gives mechanical analyses of the soil and subsoil of this type:

Mechanical analyses of Norfolk fine sand.

No.	Locality.	Description.	Organic matter.	Gravel, 2 to 1 mm.	Coarse sand, 1 to 0.5 mm.	Medium sand, 0.5 to 0.25 mm.	Fine sand, 0.25 to 0.1 mm.	Very fine sand, 0.1 to 0.05 mm.	Silt, 0.05 to 0.005 mm.	Clay, 0.005 to 0.0001 mm.
			P. ct.	*P. ct.*	*P. ct.*	*P. ct.*	*P. ct.*	*P. ct.*	*P. ct.*	*P. ct.*
8528	2 miles E. of Stockton.	Fine brown sand, 0 to 10 inches.	0.58	0.80	7.40	16.32	47.30	10.42	10.80	6.70
8526	1 mile S. of Ironshire.	Fine brown sand, 0 to 6 inches.	1.77	.62	6.56	14.40	48.96	7.24	14.30	7.80
8529	Subsoil of 8528.....	Fine yellow sand, 10 to 36 inches.	.32	.40	8.94	17.24	50.96	10.26	7.68	4.16
8527	Subsoil of 8526.....	Fine yellow sand, 6 to 36 inches.	.86	.62	4.74	14.14	50.54	6.16	14.40	8.80

ELKTON CLAY.

The Elkton clay to an average depth of 9 inches is composed of a silty loam containing little or no sand and varying in color from dark brown to drab or nearly white when dry. It is close textured and inclined to puddle when wet, but mellow and friable when dry, breaking down to an impalpable dust in the roads in very dry seasons.

The subsoil from 9 to 36 inches is a gray clay loam to clay mottled with yellow, but in small areas, usually better drained, a layer of heavy yellow loam succeeds the soil to a depth of 18 inches, grading into the mottled clay. Considerable areas are underlain at from 30 to 40 inches by a compact, coarse gray or mottled sand. The subsoil is plastic, but not tenacious when wet, and brittle and friable when dry.

This type is variously known as "white clay," "pipe clay," and "white-oak land." The latter name is derived from the fact that much of it was originally forested with a heavy growth of white oak. More than half of the area of this type is now uncleared and grown up to beech, water maple, gums, and undergrowth.

In extent Elkton clay is one of the most important soils of this county. It is found in three large areas on the uplands and in numerous smaller areas along streams near tide water. The largest area is fully 15 miles long in a north and south direction and several miles in width, and lies east of Pocomoke River and between it and the towns of Newark, Berlin, and St. Martin. Another large area is along the west bank of Pocomoke River, between Nassawango and

Dividing creeks. The third is in the southwestern part of the county below Pocomoke City.

This soil ranges in elevation from a few feet to 35 feet above tide, and occurs both on the forelands bordering the salt marshes and in large areas on the uplands, where it has an average elevation of 30 feet. It always occupies a level, depressed, or gently inclined position around the headwaters of streams or along small stream courses where the fall is slight and drainage poorly established.

The occurrence and physical properties of the soil and subsoil are such as to preclude any adequate natural drainage, and as a consequence this type is essentially a cold, sour land, puddling easily and refractory to work unless broken when in proper condition.

The areas under cultivation are drained by a system of open ditches, which require frequent cleaning to keep them from filling up and are inadequate to bring the soil into its most productive condition.

This soil is derived from the finer sediments of the latest Pleistocene formation and represents a quiet-water deposition under uniform conditions. Owing to its wetness and consequent protection from atmospheric agencies of decay it has undergone no deep changes, and except for accumulation of organic matter at the surface, it is quite uniform throughout its extent. It is sometimes underlain at a depth of about 3 feet by a sandy layer, which makes those portions somewhat easier of reclamation, but does not affect its adaptability or crop yields.

Any slight elevation in an area generally gives a stratum of yellow loam between the soil and mottled subsoil, showing how, through further weathering, this type might approach the condition of Sassafras loam and giving further evidence of its relation to that type.

When properly drained the Elkton clay makes a strong wheat, grass, and general farming soil and is capable of producing 20 to 25 bushels of wheat per acre and from 1 to 2 tons of hay. The wheat crop in the largest area will average 12 bushels per acre. This soil is used to a slight extent for stock raising, and in the southwestern part of the county quite an acreage is devoted to truck. White clover grows naturally and red clover makes a strong growth on land that has been liberally limed. Crimson clover has lately been successfully introduced.

This soil is best suited to wheat and grass, and stock raising and dairying could be profitably extended. Tile underdrainage, both to remove surplus water and to aerate and sweeten the soil, would be very beneficial. In most cases both soil and subsoil to a depth of 3 feet are so acid as to be distinctly sour to the taste. This acidity, as well as the physical condition of the soil, would be materially benefited by applications of lime. The possibilities of this type are not realized, and it offers great opportunity for improvement. Its average value is from $6 to $15 an acre.

The following table gives mechanical analyses of the soil and subsoil of this type:

Mechanical analyses of Elkton clay.

No.	Locality.	Description.	Organic matter.	Gravel, 2 to 1 mm.	Coarse sand, 1 to 0.5 mm.	Medium sand, 0.5 to 0.25 mm.	Fine sand, 0.25 to 0.1 mm.	Very fine sand, 0.1 to 0.05 mm.	Silt, 0.05 to 0.005 mm.	Clay, 0.005 to 0.0001 mm.
			P. ct.	*P. ct.*	*P. ct.*	*P. ct.*	*P. ct.*	*P. ct.*	*P. ct.*	*P. ct.*
8514	2 miles SW. of St. Martin.	Brown silty loam, 0 to 9 inches.	1.02	Tr.	0.60	1.00	7.10	11.40	61.58	17.74
8512	1 mile NW. of Newark.	Brown silty loam, 0 to 7 inches.	1.94	0.30	.60	1.10	6.90	13.60	57.90	18.60
8510	1 mile W. of Spence.	Brown silty loam, 0 to 8 inches.	4.75	Tr.	2.28	3.96	3.86	8.98	59.36	21.12
8513	Subsoil of 8512.....	Silty clay, 7 to 36 inches.	.18	Tr.	.34	.54	1.94	10.58	61.76	24.56
8515	Subsoil of 8514.....	Gray and yellow clay, 9 to 36 inches.	.28	.00	.46	1.44	8.30	7.84	56.90	25.00
8511	Subsoil of 8510.....	Silty clay loam, 8 to 36 inches.	1.04	Tr.	1.26	3.04	3.82	11.64	52.10	27.90

PORTSMOUTH SANDY LOAM.

The soil of the Portsmouth sandy loam varies from 9 to 15 inches in depth, with an average of 12 inches, and consists of a black, mucky loam holding some sand or it may be quite sandy, the two phases occurring in close proximity and being about equal in extent.

The subsoil is uniform and consists of a gray or mottled clay, more or less sandy, to an average depth of 24 inches, underlain by a sandier layer of the same color which becomes compact and impervious at depths slightly less than 3 feet. This compact layer is coarser in texture and sounds like a rock when struck with a soil auger. A similar stratum underlies the Portsmouth sand and a part of the Elkton clay types at the same or at greater depth.

This type reaches its greatest development in a large connected area of irregular outline lying between Pocomoke City, Stockton, and Girdletree and extending from Bethesden Church south to the Virginia line. Another large area occurs in the northern part of the county as a belt between the Portsmouth sand and Elkton clay. The other principal occurrences are in Devils Swamp near Boxiron, and on the base of Sinepuxent Neck.

The Portsmouth sandy loam is mainly an upland type occupying level, depressed, or only gently inclined areas around the headwaters of small drainage systems, on low divides, and adjacent to streams having slight fall or obstructed drainage. In occurrence, origin, and position it is allied to Elkton clay and Portsmouth sand. The greater part of the type in this county lies at an average elevation of 30 feet

above tide. Narrow ridges of Norfolk sand, having an elevation of from 3 to 10 feet above the surrounding type, occur irregularly through it; otherwise its level topography is unbroken.

The origin of this type and its peculiar features are mainly due to an almost complete lack of natural drainage. In its original condition the type is semimarshy and large portions are covered with standing water the greater part of the year. The subsoil is quite impervious, and moisture circulation and natural underdrainage are still further impeded by the underlying stratum of compact sand.

The materials constituting Portsmouth sandy loam were originally of marine deposition, but have been largely modified by recent swamp development and to-day present a phase of headwater swamp conditions. The black loamy character of the soil is due to the accumulation of organic matter common in all swamps. The immediate subsoil indicates a condition of deposition similar to that which gave rise to Elkton clay.

Corn is the principal crop and averages from 20 to 25 bushels per acre, but yields of from 30 to 35 bushels are obtained in good seasons. Sweet potatoes will yield 100 bushels per acre. Strawberries and green peas are quite extensively grown and with good results. The heavier truck and canning crops are also grown. Wheat and grass are seldom grown, although the heavier phase of this type affords fair pasturage.

The Portsmouth sandy loam, when adequately drained, is well suited to the production of heavy truck and canning crops, cabbage, and all sorts of berries. On the more mucky phase onions and celery should do well. Most of the type is very acid and requires liberal applications of lime, and all of it needs artificial drainage.

The following table gives mechanical analyses of the soil and subsoil of this type:

Mechanical analyses of Portsmouth sandy loam.

No.	Locality.	Description.	Organic matter.	Gravel 2 to 1 mm.	Coarse sand, 1 to 0.5 mm.	Medium sand, 0.5 to 0.25 mm.	Fine sand, 0.25 to 0.1 mm.	Very fine sand, 0.1 to 0.05 mm.	Silt, 0.05 to 0.005 mm.	Clay, 0.005 to 0.0001 mm.
			P. ct.	*P. ct.*	*P. ct.*	*P. ct.*	*P. ct.*	*P. ct.*	*P. ct.*	*P. ct.*
8534	3 miles NE. of Berlin.	Black sandy loam, 0 to 12 inches.	6.89	0.70	9.64	15.86	34.44	12.08	17.26	9.60
8537	2½ miles E. of Goodwill.	Loam, 0 to 12 inches.	10.93	.80	4.92	7.30	31.70	13.00	23.64	18.70
8535	Subsoil of 8534.....	Gray sandy clay, 12 to 24 inches.	1.74	.60	6.60	11.70	28.80	11.72	25.04	16.06
8538	Subsoil of 8537.....	Loam, 12 to 24 inches.	1.90	.40	2.06	3.26	15.76	11.48	36.90	30.14

PORTSMOUTH SAND.

The soil of Portsmouth sand ranges in depth from 8 to 18 inches, with an average of 12 inches, and consists of a medium to fine loamy sand to sandy loam, usually black in color and ranging through reddish brown to light brown.

The subsoil, from 12 to 36 inches, grades from a reddish-brown, sticky sand of medium to fine texture to a gray or mottled sand, becoming coarser and looser in the lower depths and always underlain at from 20 to 36 inches by a coarse gray sand, compact and very impervious to moisture.

This type occurs in two large areas along the northern boundary of the county, one lying between Pocomoke River and Dividing Creek and extending on the north into Wicomico County and on the west into Somerset, the other lying east of Pocomoke River and extending into Delaware on the north near Cedar Swamp.

The Portsmouth sand is distinctly an upland type, occupying a generally level, plateaulike area having an average elevation of 35 to 40 feet. It represents a phase of headwater swamp conditions very similar to the Portmouth sandy loam. It is traversed by the same narrow ridges of Norfolk sand, and presents to a marked degree the same topographic features.

The absence of natural drainage is the most striking feature of this type, and is caused by its basinlike topography, augmented by the impervious sandy layer, whose depth is subject to a greater fluctuation than that underlying the sandy loam.

The portion under cultivation has been partially drained by open ditches. The undrained areas are filled with a dense growth of water maple, gums, water birch, holly, alder, and a thick undergrowth of briers and gallberry bushes. The surface is covered with standing water until late in the spring.

The mineral particles which go to make up this type are of sedimentary origin, and were deposited on the former sea floor. The present physical characteristics are the result of recent swamp development, accumulation, partial decay, and leaching of organic matter since the elevation of this region above tide. The mineral constituents, consisting mainly of quartz sand, have undergone little change.

Corn is the principal crop grown and yields but poorly, even in the best seasons, 20 bushels per acre probably being a fair average. Small fruits do fairly well, particularly strawberries and blackberries, which are being extensively raised on those areas within reach of shipping facilities. Small grains are not grown except in small patches for home use. Sweet and Irish potatoes do well, but are not grown to any great extent.

It is in the production of berries that this type reaches its best development. Onions have been tried in a small way with enough

success to warrant an extension of the crop. The soil is poorly suited to grass. The extension of the ditching systems to remove surplus water, the application of lime to correct the acidity, and the plowing under of leguminous crops to improve the texture and add to the productiveness of the soil would all be of great benefit.

The following table gives mechanical analyses of the soil and subsoil of this type:

Mechanical analyses of Portsmouth sand.

No.	Locality.	Description.	Organic matter.	Gravel, 2 to 1 mm.	Coarse sand, 1 to 0.5 mm.	Medium sand, 0.5 to 0.25 mm.	Fine sand, 0.25 to 0.1 mm.	Very fine sand, 0.1 to 0.05 mm.	Silt, 0.05 to 0.005 mm.	Clay, 0.005 to 0.0001 mm.
			P. ct.	*P. ct.*	*P. ct.*	*P. ct.*	*P. ct.*	*P. ct.*	*P. ct.*	*P. ct.*
8532	1½ miles NW. of Bishop.	Black loamy sand, 0 to 13 inches.	2.33	0.50	4.80	10.60	55.96	14.70	8.28	4.26
8530	3 miles W. of Longridge.	Black to brown sand, 0 to 12 inches.	2.97	1.90	16.76	26.04	31.74	5.48	6.70	11.34
8533	Subsoil of 8532....	Yellow to gray sand, 13 to 36 inches.	.40	2.00	7.44	15.86	60.64	9.26	2.46	1.92
8531	Subsoil of 8530....	Gray sand, 12 to 36 inches.	.67	1.00	14.74	25.28	40.40	7.30	3.50	7.90

GALVESTON SAND.

Galveston sand consists of a light, loose, incoherent gray sand, having a depth of 12 inches, underlain to depths greater than 3 feet by a subsoil of the same nature. Both soil and subsoil sometimes contain many shell fragments. The size of the component sand particles varies greatly in a small space, and thin bands of black hornblendic material traverse the formation in a general horizontal direction.

This type occurs only on the long, narrow beach which separates Chincoteague, Sinepuxent, and the Isle of Wight bays from the ocean and which forms the eastern boundary of the county throughout its extent, having a northeast and southwest trend.

In reach of the surf this type is low and flat, but rises in dunes to a height of 15 feet toward its central axis. It descends rather abruptly and in ragged outline to the bays on the west, while its seaward boundary is smooth and unbroken.

Near sea level water rises within a few inches of the surface, while in those parts highest above tide the loose materials are incapable of retaining moisture except by slight capillarity, and here the water table sinks some distance below the surface.

The Galveston sand is a type of shore-line formation of comparatively recent date, and is still being deposited. Consisting almost entirely of rounded quartz sand, it is subject to little change except in

surface configuration through wave and wind action, but its surface is constantly being changed through the influence of these agencies.

It is entirely uncultivated in this area, and where constantly drenched by the sea spray it supports only a scattering growth of salt-resisting shrubs and rank grasses. The surfmen maintain a few small garden plots near the life-saving stations, but the type is of no agricultural value at present.

Some protected areas might be made to produce early truck with the aid of manures.

The following table gives mechanical analyses of the soil and subsoil of this type:

Mechanical analyses of Galveston sand.

No.	Locality.	Description.	Organic matter.	Gravel, 2 to 1 mm.	Coarse sand, 1 to 0.5 mm.	Medium sand, 0.5 to 0.25 mm.	Fine sand, 0.25 to 0.1 mm.	Very fine sand, 0.1 to 0.05 mm.	Silt, 0.05 to 0.005 mm.	Clay, 0.005 to 0.0001 mm.
			P. ct.	*P. ct.*	*P. ct.*	*P. ct.*	*P. ct.*	*P. ct.*	*P. ct.*	*P. ct.*
8520	Ocean City	Gray sand, 0 to 12 inches.	0.12	1.60	17.40	36.20	43.46	1.06	0.00	0.00
8521	Subsoil of 8520....	Gray sand, 12 to 36 inches.	.20	.24	6.56	37.16	53.36	2.30	.00	.06

GALVESTON CLAY.

The soil of Galveston clay, to an average depth of 12 inches, consists of a black, brown, or drab clay loam or clay, often slimy, and containing a large amount of decomposing vegetable matter. The subsoil, to a depth of 3 feet or more, is usually a slightly heavier clay of lighter color, containing less organic matter.

This type represents the extensive salt marshes developed along the Atlantic and Gulf coasts, and occurs where the tides rise and fall in quiet water. In this area the Galveston clay is confined principally to a narrow fringe around Chincoteague, Sinepuxent, and Isle of Wight bays and the lower part of Pocomoke River as far as the salt tides extend. Small strips extend a short distance up many of the streams of the Atlantic drainage, and it forms numerous small islands in the bays.

From its nature it can not extend above high-tide limit in elevation, and is flat or gently inclined toward the sea. Small areas of higher elevation occurring in these marshes are generally composed of Norfolk fine sand.

Natural drainage is entirely lacking, and artificial drainage can only be accomplished by first diking to keep out the tides. Flooding with fresh water, if available, or allowing the rains to remove the salt, and

burning the peatlike surface, followed by drainage of the subsoil, would fit the land for agricultural purposes.

The Galveston clay is of sedimentary origin and owes its formation to the deposition of fine sediments in shallow, quiet waters with every rise of the tide. It is therefore one of the most recent of the soils of this or any other locality and has undergone little weathering.

This type is not at present adapted to tillage, but supports a rank growth of coarse grasses and salt bushes, which furnish a poor pasturage. It is used only for grazing.

Large areas of salt marsh have been successfully reclaimed in this and other countries, particularly in Holland. The cost varies from $8 to $20 an acre, and is profitable where the land has a favorable location. In this area land values are too low to render the reclamation of this type profitable at this time.

The following table gives mechanical analyses of the soil and subsoil of this type:

Mechanical analyses of Galveston clay.

No.	Locality.	Description.	Organic matter.	Gravel, 2 to 1 mm.	Coarse sand, 1 to 0.5 mm.	Medium sand, 0.5 to 0.25 mm.	Fine sand, 0.25 to 0.1 mm.	Very fine sand, 0.1 to 0.05 mm.	Silt, 0.05 to 0.005 mm.	Clay, 0.005 to 0.0001 mm.
			P. ct.	*P. ct.*	*P. ct.*	*P. ct.*	*P. ct.*	*P. ct.*	*P. ct.*	*P. ct.*
8518	Near Ocean City bridge.	Dark brown clay, 0 to 12 inches.	1.96	1.40	7.00	5.20	26.80	23.80	23.04	12.08
8519	Subsoil of 8518.....	Brown to gray clay, 12 to 36 inches.	2.35	.70	4.90	6.60	30.50	19.12	25.26	12.90

SWAMP.

Low-lying areas which are filled with standing water, which are impossible of cultivation, and to which no definite texture could be ascribed, have been classed as Swamp. They are of two varieties, those bordering large streams in which backwater rises from 2 to 6 feet with every tide, the texture of which usually consists of from 12 to 20 inches of black muck underlain by sand, and upland swamps caused by insufficient or obstructed drainage, the texture of which is usually largely influenced by surrounding types.

This latter class occurs mostly in Elkton clay areas and consists of from 6 to 18 inches of muck underlain by mottled clay characteristic of the Elkton clay subsoil. The texture of those swamps included in Portsmouth sand is identical with the class first described. Those bordering the streams are filled with a valuable growth of cypress. The natural growth in the upland swamps is gum and water maple.

The principal occurrence of fresh-water Swamp extends in an unbroken belt on both sides of Pocomoke River throughout the county. Smaller areas border Nassawango and Dividing creeks. The upland swamps occur chiefly in the northern and extreme southwestern parts of the county.

Along the stream courses this type rises but a few feet above tide, while the upland variety occupies an elevation of from 20 to 35 feet above sea level. The areas of this type are necessarily gently inclined toward tide, and are either level or form saucer-shaped depressions.

The formation of the swamps is due to lack of drainage. It is impracticable to exclude the backwater from those areas along tidal streams, and it is therefore doubtful if they will ever be reclaimed for tillage. The upland phase could be readily drained and fitted for agricultural use and would then become a part of the surrounding types.

This type is a result of a modification of recent swamp development subsequently to its last elevation above tide, and the surface soil is nothing more than vegetable accumulation. A belt of muck underlies most of the areas at a depth of from 10 to 20 feet, indicating the existence at some previous uplift of extensive swamps which were buried underneath a mantle of sediments at the last period of subsidence.

None of the Swamp in this area is cultivated. Former areas of Swamp now capable of tillage have been included, according to their texture, with the Portsmouth sand, Portsmouth sandy loam, or Elkton clay. The salt marshes are considered in the description of Galveston clay.

AGRICULTURAL METHODS.

Some form of crop rotation is used on nearly all the different soils, the usual sequence on those types used for general farming being corn followed by wheat or other small grain, then grass for two seasons. Sometimes potatoes or some special crop is used in the system. On those types on which no wheat is grown various practices obtain. On the Portsmouth sand corn often follows corn indefinitely, or strawberries are grown till they cease to produce profitable crops, and are followed by corn until such time as the field shall be set again to strawberries. On the Norfolk sand cowpeas, sweet potatoes, and truck crops alternate with corn.

A peculiar method of planting corn called "backfurrowing" is in general use on Portsmouth sand and Portsmouth sandy loam, and to a less extent on other types which are inclined to remain wet late in the season. The practice consists of turning two furrows together, leaving a trench or dead furrow into which the surplus water drains. Furrows are then plowed across at the desired intervals. The manure

or fertilizer to be used is dropped at the intersections of these furrows, where the hills of corn are to be, and the seed dropped directly in the fertilizer. The field is then harrowed and the covering of the seed accomplished at the same time. The advantages claimed for this method are the drying of the surface soil to permit earlier planting, the application of the fertilizer where it will be readily available, and a saving of labor in the preparation of the seed bed. The disadvantages are that the soil is not as completely inverted as it should be, much of it falling back to its original position when it is cross plowed without harrowing, and the land is liable to form clods which are never well broken up by subsequent tillage. Judging from results it is a questionable practice, and should be superseded by more rational methods of disposing of the surplus water. A little attention to drainage would permanently accomplish the desired result.

The general methods of agriculture pursued in this community compare favorably with those used in the other grain growing and general farming sections of the State and differ from them in no essential particulars. They are not as thorough as could be desired, and must advance if the yields of wheat and corn are to be maintained.

The corn crop is harvested generally by topping and stripping the blades. This matures a good quality of corn and yields a fodder which is eaten by stock without waste. The fodder is stacked in the field and hauled in as needed. Severe storms frequently injure a large part of it. This method entails a great deal of labor and the loss of much valuable material which might be utilized by the construction of silos or by shredding.

Both white and colored labor is employed in picking the strawberry crop, receiving 1½ cents a basket. The colored help usually camp on the farm where employed during the picking season.

AGRICULTURAL CONDITIONS.

The agricultural interests of Worcester County for a long period of years have been chiefly confined to the production of the staple crops, but in the past few years considerable attention has been given to truck crops, particularly in the southern part of the area, where the industry has extended from Accomac County, Va. Truck is also grown in the northern part, west of Pocomoke River, where the soils are generally too light for grain, and in the vicinity of Ocean City, where local demand has stimulated market gardening.

The agricultural population in general is in a fairly prosperous condition. The homes are usually comfortable but unpretentious frame houses. Outbuildings are small, and substantial barns are seldom seen and are usually unnecessary, on account of the mildness of the

climate. The rivers and bays abound in fish, oysters, and other sea food, and the simple necessities of life are easily obtained.

About 40 per cent of the area is farmed by tenants on shares. The contract is usually simply a verbal one, the landlord receiving, in most cases, one-third of the corn, one-half of the fodder, and one-third of the wheat. The landlord furnishes the fertilizer. The tenant often applies most of the fertilizer to the garden and those crops to be consumed on the farm, so that under this system the land in general is liable to deteriorate seriously in productiveness unless the owner exercises some oversight in the management of the farm.

There are several plantations of over 1,000 acres in extent which are rented out to white tenants on the above plan and over which the owner exercises some supervision. Quite a number range in size from 400 to 600 acres, but the general average is from 100 to 200 acres. Farms of this size are better managed and better kept up. They are mostly farmed by the owner. Many small tracts are farmed by colored people, but they grow little more than enough for their personal needs.

Colored labor is employed almost exclusively. One of the greatest problems before the community to-day is the securing of efficient, dependable labor to plant and harvest the crops. There is a constantly growing tendency on the part of the colored population to flock to towns and to work only enough to obtain the barest necessaries of life. Thus the farmer often finds himself unable to obtain sufficient help to plant or harvest his crops in season, and this, more than any other cause, deters many from more extensive farming operations and seriously checks the development of the section.

Wheat is the great staple and money crop on the heavier soils of the county. Corn is an important crop on nearly all of the soil types, but varies in yield from 10 or 15 bushels on the poorest land to 60 bushels or more, in favorable seasons, on those soils to which it is best adapted.

The growing of Irish potatoes is receiving considerable attention, particularly on the sandy loams and the Norfolk fine sand. This product is grown with good success and bids fair to become a leading crop on these types. Sweet potatoes are largely grown on the sandier soils, notably in the southern part of the county. Strawberries are an important crop on the two Portsmouth types, as well as some others, but the cost of picking, high transportation rates, and uncertainty of the markets render profits very uncertain. Much could be done to render the crop more profitable by a little cooperation among the growers in regard to marketing the crop. A great deal has been accomplished along this line in other parts of the country, particularly with grapes and apples, and in other truck areas, as around Norfolk. Green peas and tomatoes are grown to some extent for shipping, and

the introduction of several canneries has stimulated the growing of canning crops. Cowpeas are grown for profit and for improving the soil. Crimson clover has been successfully introduced on several types.

Several of the better drained soil types are well adapted to peach culture, and several years ago it was quite an extensive industry, but for various reasons it has declined, chief of which was the uncertainty of the crop and liability to damage by frost. It has largely been replaced by strawberry and potato culture, but there is every reason to believe it will soon develop again into an important industry, as such has been the case on the same soils in nearby localities. Many large nurseries, particularly at Berlin and Ironshire, annually ship many thousands of peach and apple tree stock to all parts of the Peninsula and to the country at large.

Oats were until recently largely grown, but the acreage is falling off year by year. They make a good growth, but the grain is light in weight and of poor quality. Several of the soil types are admirably adapted to the production of hay, and too little attention is given this important crop, as the county produces but a small part of the amount it consumes, when it should be yielding a surplus.

Little attention is given to stock raising and dairy industries, although large areas of soils at present little used are well suited to these pursuits and there is good demand in the home market for dairy products. Some sheep grazing is carried on, but not to an important extent.

Although possessing many of the same soils which have attained such a high development as truck producers in New Jersey and elsewhere along the Atlantic seaboard, the Worcester County farmers, with characteristic conservatism, have held to the cultivation of wheat and corn for over a century, with little regard to the peculiar fitness of many of these soils to a particular range of crops. Corn and wheat have been grown in regular rotation alike on the loosest sand hills and on the heaviest clays. Only within the past few years have they turned their attention to the growing of suitable crops on the types which could not profitably produce wheat and corn.

Slowly and steadily the trucking industry and specialization of crops is extending, and no other section of the great truck belt offers more inducements and advantages nor greater possibilities of success than Worcester County.

The Delaware, Maryland and Virginia Railroad traverses the country from north to south along the main divide. The Baltimore, Chesapeake and Atlantic enters near the northwestern border and runs to Ocean City, on the coast. The New York, Philadelphia and Norfolk enters the limits of the area at Pocomoke City and furnishes transportation to the southwestern part of the county. A line of large freight

and passenger steamers makes frequent sailings from Snowhill and Pocomoke City to Baltimore.

All these lines of transportation are under the control of one corporation and shippers complain of high freight rates and inadequate service. A large part of the area is directly on or conveniently near to waterways, which should afford a cheap means of transportation to the large markets, and doubtless favorable rates could be secured whenever the bulk of shipments would warrant. However, present rates and facilities tend to retard the development of the trucking industry to no small degree. The fact remains that the county does not produce at present a sufficient quantity or variety of vegetables to supply even the home market, and no reason for this can be assigned.

Roads are numerous and in fair condition, although some are so sandy as to require excessive power to draw an ordinary load. Secondary roads are frequent and the entire area is easily accessible. Roads are maintained by a money tax. Little attention is given to construction of a permanent nature, most of the improvements consisting of cutting the brush and grading and opening side drains. Some of the large towns have a few stretches of shelled roads in good condition, which are quite satisfactory and serviceable. The roads through the clay areas are good in dry weather, but cut deeply and are sometimes nearly impassable in wet weather. Construction material is lacking, there being no rock in the county, and the gravel beds, while abundant elsewhere in Coastal Plain Maryland, are not found here.

The area is favorably situated for reaching the large markets of Baltimore, Philadelphia, and New York, while Ocean City during the summer months furnishes a good outlet for market gardening and dairy products. The truck soils of Worcester County are fully as well situated in regard to large markets as in many other sections where they have attained a higher development, and there is no reason why the same results should not eventually be reached here, as far as the question of disposal of the crop is concerned.

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U.S. DEPT OF AGRICULTURE
BUREAU OF SOILS
MILTON WHITNEY, CHIEF

SOIL MAP
MARYLAND
WORCESTER COUNTY SHEET

MARYLAND AGRICULTURAL
EXPERIMENT STATION
H.J. PATTERSON, DIRECTOR

MARYLAND GEOLOGICAL SURVEY
WM BULLOCK CLARK, STATE GEOLOGIST

SOIL PROFILE
(3 feet deep)

Norfolk sand — S / S

Portsmouth sand — S / Ssc / S

Galveston sand — S / S

Norfolk fine sand — S / S

Sassafras sandy loam — Ssc / Sc

Portsmouth sandy loam — Ssc / Scc / S

Sassafras loam — Sic / Sic Scc

Elkton clay — Sic / Scc

Galveston clay — C / C

LEGEND

S	Sand
S Ssc	Sand and sandy loam
Ssc	Sandy loam
Sc	Loam
Scc	Clay loam
Sic	Silt loam
Sic Scc	Silt loam and clay loam
C	Clay

LEGEND

Ns	Norfolk sand
Ps	Portsmouth sand
Gs	Galveston sand
Nfs	Norfolk fine sand
Ssl	Sassafras sandy loam
Psl	Portsmouth sandy loam
Sl	Sassafras loam
Ec	Elkton clay
Gc	Galveston clay
	Swamp

Soils Surveyed by
F.E. Bonsteel
and William T. Carter, Jr.
1903.

BASE MAP FROM
U.S. GEOLOGICAL SURVEY
AND
MARYLAND GEOLOGICAL SURVEY
EDITIONS OF 1901 AND 1902.

A. Hoen & Co. Lith. Baltimore, Md.

Scale 1 inch = 1 mile

Field Operations
Bureau of Soils
1903